DOCUMENT RESUME

ED 269 916 EC 182 400

AUTHOR Montague, Elaine C.
TITLE The Motor Specialist and Classroom Teacher Team with Logo.
PUB DATE Apr 86
NOTE 24p.; Paper presented at the Annual Convention of the Council for Exceptional Children (64th, New Orleans, LA, March 31-April 4, 1986).
PUB TYPE Speeches/Conference Papers (150) -- Guides - Classroom Use - Guides (For Teachers) (052)

EDRS PRICE MF01/PC01 Plus Postage.
DESCRIPTORS *Computer Assisted Instruction; *Disabilities; Elementary Education; *Motor Development; *Occupational Therapy; Perceptual Motor Learning; *Spatial Ability
IDENTIFIERS LOGO System

ABSTRACT

The paper describes a Logo environment designed by an occupational therapist to help 10 disabled students (6-9 years old) explore relative distance, directionality, and spatial relations. The program's goals include enhancing students' language development, planning skills, decision making, risk taking, and problem solving. Logo is briefly reviewed, and procedures for implementing the specific Logo environment noted. Two programs featured (1) abstract on-screen problem solving preceded by concrete physical activities and (2) a sequence of mazes. Teacher and student evaluation data are noted and guidelines are presented for replicating this type of project. (CL)

****
* Reproductions supplied by EDRS are the best that can be made *
* from the original document. *
****

U.S. DEPARTMENT OF EDUCATION
Office of Educational Research and Improvement
EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)
☑ This document has been reproduced as received from the person or organization originating it.
• Points of view or opinions stated in this document do not necessarily represent official NIE position or policy.

ED269916

ABSTRACT OF PAPER SUBMITTED FOR ERIC CONSIDERATION

THE MOTOR SPECIALIST AND THE CLASSROOM TEACHER TEAM WITH LOGO

AUTHOR: ELAINE C. MONTAGUE
6009 ASPEN AVENUE NE
ALBUQUERQUE, NEW MEXICO 87110

A COMPUTER PROGRAM WAS NEEDED FOR USE IN AN OCCUPATIONAL THERAPY CLASSROOM IN THE ALBUQUERQUE PUBLIC SCHOOLS. THE THERAPISTS HAD REQUESTED A MICROCOMPUTER BE PLACED IN THE PROGRAM FOR EXPERIMENTAL PURPOSES. AS THEY EXPLORED ITS USE WITH A WIDE RANGE OF STUDENTS BUSSED TO THEM FROM SEVERAL SCHOOLS, THEY FOUND AVAILABLE COMMERCIAL PROGRAMS DID NOT MEET THEIR GOALS OF STRENGTHENING VISUAL PERCEPTION AND MOTOR SKILLS.

AS COMPUTER RESOURCE TEACHER, I DESIGNED A LOGO ENVIRONMENT IN WHICH STUDENTS COULD EXPLORE RELATIVE DISTANCE, DIRECTIONALITY, AND SPATIAL RELATIONS. THIS WOULD ENHANCE LANGUAGE DEVELOPMENT, PLANNING SKILLS, DECISION-MAKING, RISK-TAKING, AND PROBLEM SOLVING. ONE PROGRAM CONSISTS OF SIXTY-EIGHT SEQUENCED TASKS AND SEVERAL OTHER PROCEDURES WHICH ALLOW A STUDENT TO MOVE A DESIGNATED SCREEN OBJECT (THE LOGO TURTLE, A SMALL TRIANGULAR SHAPE) AND DRAW A LINE SO IT IS TOUCHING ANOTHER SHAPE (SQUARE, CIRCLE OR TRIANGLE) PLACED IN ONE OF NINE DESIGNATED SCREEN LOCATIONS. DIRECTION AND SIZE OF THE ANGLE OF THE TURTLE'S MOVEMENT ARE CONTROLLED AND SEQUENCED BY ORDER OF PRESENTATION OF STIMULI. ABSTRACT ONSCREEN PROBLEM-SOLVING IS PRECEDED BY REAL-BODY ON-FLOOR CONCRETE PHYSICAL ACTIVITIES SO THE STUDENT UNDERSTANDS RIGHT AND LEFT TURNS, FORWARD AND BACKWARD MOVEMENTS, AND RELATIVE DISTANCES. IN SOME SCHOOLS THE OCCUPATIONAL THERAPIST OR ADAPTED PE TEACHER WOULD WORK WITH THE STUDENT ON CONCRETE ACTIVITIES AND THE CLASSROOM TEACHER WOULD WORK WITH HIM/HER ON COMPUTER ACTIVITIES. IN OTHER SETTINGS, THE CLASSROOM TEACHER WOULD DO BOTH.

ANOTHER PROGRAM CONSISTS OF MAZES SEQUENCED FROM SIMPLE TO COMPLEX. A MAZE APPEARS ON SCREEN. THE STUDENT SOLVES IT BY MOVING THE TURTLE, SHOWING THE RESULTS TO THE TEACHER. AT FIRST, CONSISTENCY OF THE TURTLE'S HEADING IS MAINTAINED TO HELP THE STUDENT DEVELOP RELIABLE POSITION IN SPACE RELATIONSHIPS; LATER, THE HEADING CAN BE CHANGED.

"PERMISSION TO REPRODUCE THIS MATERIAL HAS BEEN GRANTED BY
Elaine C. Montague
TO THE EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)."

EC 182400

BEST COPY AVAILABLE

PROGRAM COMMANDS ARE SIMPLE AND CAN BE LEARNED BY ROTE. THERE ARE ONLY 3 RULES. ONLY RULE ONE NEEDS BE LEARNED TO SUCCEED AT THE FIRST SEVENTEEN TASKS AND FIRST FOUR MAZES. RULE 2 BUILDS ON RULE 1. RULE 3 BUILDS ON 1 AND 2.

TASKS AND MAZES MAY BE INTEGRATED OR TAUGHT SEPARATELY AS STUDENTS SUCCESSFULLY MASTER RULES AND SOLVE PROBLEMS PRESENTED. THERE ARE PROBLEMS WITH ONE SOLUTION OR MULTIPLE SOLUTIONS. RULES MAY BE CHANGED BY THE TEACHER TO MODIFY THE TASKS AND EXTEND LEARNING. SCREENS CAN BE PRINTED OUT TO CREATE WORKSHEETS IF DESIRED. THE PROGRAM IS WRITTEN IN IBM LOGO AND RUNS ON THE IBM PC AND THE PC JR. IT COULD EASILY BE WRITTEN IN A LOGO FOR ANY OTHER COMPUTER.

THE PAPER DESCRIBES BOTH OT AND CLASSROOM ACTIVITIES WHICH WERE USED IN A FIELD TEST WITH TEN STUDENTS AT A SIDE-BY-SIDE SCHOOL FOR PHYSICALLY IMPAIRED CHILDREN DURING 1985-86. IT ESTABLISHES THE PHILOSOPHY WHICH WILL FACILITATE USE OF THIS PROGRAM. ALTERNATIVE INPUT DEVICES ARE ADDRESSED. THE POPULATION RANGED FROM DEVELOPMENTAL AGE OF THREE YEARS TO 12. STUDENT GAINS AS ASSESSED OR OBSERVED ARE OUTLINED. THERE ARE GUIDELINES TO STAFF WHO WISH TO REPLICATE THE PROJECT. THESE GUIDELINES INCLUDE THE MAJOR ELEMENTS TO CONSIDER : PHILOSOPHY, PERSONNEL, SELECTION OF STUDENTS, HOW MATERIALS ARE TO BE USED, INITIAL IMPLEMENTATION, SELECTION OF RESOURCES, ROLE OF PHYSICAL ACTIVITIES, AND THE POWER OF CONTROL OVER THE ENVIRONMENT, WHICH IS INHERENT IN LOGO!

THIS PROGRAM HAS BEEN RECOMMENDED FOR ELEMENTARY AND MIDDLE SCHOOL SPECIAL EDUCATION STUDENTS WITH DIRECTIONALITY PROBLEMS AND LITTLE OR NO EXPERIENCE WITH LOGO. IT HAS BEEN REQUESTED BY OCCUPATIONAL THERAPISTS AND SPEECH AND LANGUAGE PATHOLOGISTS, EVEN AT THE HIGH SCHOOL LEVEL.

THE MOTOR SPECIALIST AND CLASSROOM TEACHER TEAM WITH LOGO

AUTHOR: ELAINE C. MONTAGUE
6009 ASPEN AVENUE NE
ALBUQUERQUE, NEW MEXICO 87110

I. THE LOGO EXPLORATION WAS BEGUN IN FALL 1985 AT AN ELEMENTARY SCHOOL SITE IN ALBUQUERQUE, NEW MEXICO. MARK TWAIN SCHOOL HAS ABOUT 300 REGULAR ED STUDENTS AND 60 PHYSICALLY IMPAIRED ONES. THERE IS A SUPPORT TEAM OF THREE OCCUPATIONAL THERAPISTS, TWO PHYSICAL THERAPISTS, TWO SPEECH AND LANGUAGE PATHOLOGISTS, AND ONE ADAPTED PE INSTRUCTOR. THE SCHOOL IS CALLED A "SIDE-BY-SIDE" SCHOOL BECAUSE REGULAR AND SPECIAL ED CHILDREN PARTICIPATE SIDE-BY-SIDE IN THE LEARNING ENVIRONMENT WITH AS MUCH MAINSTREAMING AS IS POSSIBLE. THE PURPOSE OF THE LOGO EXPLORATION WAS:

A. TO EXPLORE THE BENEFITS OF USING A SPECIFIC APPLICATION PROGRAM, TURTLE TASKS AND TURTLE MAZES, WITH ELEMENTARY PHYSICALLY IMPAIRED STUDENTS;

B. TO DEMONSTRATE A METHOD OF TEAMING BETWEEN OT'S AND CLASSROOM TEACHERS IN PLANNING A PORTION OF THE CHILD'S EDUCATIONAL PROGRAM;

C. TO DEMONSTRATE THE USEFULNESS OF USING LOGO IN THIS TEAMING PROCESS; AND

D. TO HELP OT'S GROW IN THEIR UNDERSTANDING OF THE ACADEMIC PROCESS AND CLASSROOM TEACHERS GROW IN UNDERSTANDING THE IMPORTANCE OF MOTOR DEVELOPMENT AND ITS NATURAL RELATIONSHIP TO LEARNING.

II. HISTORY AND OVERVIEW

IN 1984-85, A COMPUTER PROGRAM WAS NEEDED FOR USE IN AN OCCUPATONAL THERAPY CLASSROOM IN THE ALBUQUERQUE PUBLIC SCHOOLS. THE THERAPISTS HAD REQUESTED A MICROCOMPUTER BE PLACED IN THE PROGRAM FOR EXPERIMENTAL PURPOSES. AS THEY EXPLORED ITS USE WITH

BEST COPY AVAILABLE

BEST COPY AVAILABLE

A WIDE RANGE OF STUDENTS BUSSED TO THEM FROM SEVERAL SCHOOLS, THEY FOUND AVAILABLE COMMERCIAL PROGRAMS DID NOT MEET THEIR GOALS OF STRENGTHENING VISUAL PERCEPTION AND MOTOR SKILLS. I THOUGHT LOGO WAS THE ANSWER BECAUSE IT WOULD ALLOW THEM TO CREATE THE SETTINGS AND PROBLEMS THEY WANTED STUDENTS TO EXPLORE.

LET ME SHARE A FEW IDEAS ABOUT LOGO WITH YOU BEFORE PROCEDING WITH TASKS AND MAZES. DEVELOPED AT MIT UNDER THE GUIDANCE OF SEYMOUR PAPERT, LOGO IS A PROGRAMMING LANGUAGE WHICH CAN BE LEARNED BY CHILDREN AS YOUNG AS PRESCHOOL AND WHICH IS POWERFUL ENOUGH TO WARRANT EXPLORATION BY COLLEGE STUDENTS AT MIT. PAPERT ENVISIONS REORGANIZING SCHOOLING AND ALLOWING CHILDREN TO EXPLORE PROBLEM-SOLVING ENVIRONMENTS WITH THE MICRO AS A POWERFUL TOOL IN THAT EXPLORATION. THE MAJOR CHARACTER IS A FELLOW CALLED "TURTLE." TURTLE'S PREDECESSOR WAS A SMALL ROBOT WHICH WAS PROGRAMMED TO MOVE UPON COMMAND AND TO DRAW OR NOT DRAW AS IT MOVED. TURTLE IS A LITTLE TRIANGULAR LIGHT. TURTLE HAS A VISIBLE SHAPE, POSITION AND HEADING. BECAUSE IT CAN BE PROGRAMMED WITH SEQUENCES OF IDEAS CALLED PROCEDURES, TURTLE CAN PERFORM MORE AND MORE COMPLEX TRICKS SIMPLY BY INCORPORATING SIMPLER PROCEDURES INTO MORE COMPLEX ONES. FOR INSTANCE, IF WE WANT TURTLE TO BUILD A HOUSE, HE MUST KNOW HOW TO BUILD A BOX FOR THE WALLS AND A TRIANGLE FOR THE ROOF. WE CAN TELL HIM TO DO THESE THINGS ONE AT A TIME OR SUGGEST HE CREATE THE WHOLE NEIGHBORHOOD! THIS DELIGHTFUL LITTLE FELLOW ALSO HAS A WAY TO TELL US WHEN HE DOES NOT UNDERSTAND OUR INSTRUCTIONS: STUDENTS MUST LEARN ELEMENTARY DEBUGGING AS THEY RESPOND TO TURTLE'S, "I DON'T KNOW HOW TO..." SYNTAX OF COMMANDS, CORRECT TYPING, AND SEQUENCING ARE IMPORTANT TO TURTLE. IN THE BEGINNING, STUDENTS MUST USE A FEW COMMANDS TO INSTRUCT HIM, SUCH AS FORWARD AND BACK A NUMBER OF STEPS OR RIGHT AND LEFT A NUMBER OF DEGREES. THEY MUST KNOW WHAT THE CURSOR IS AND WHERE IT IS. THEY MUST BEGIN TO UNDERSTAND THAT TURTLE HAS A VISIBLE SHAPE, A POSITION AND A HEADING.

WHEN CHILDREN LEARN ABOUT LOGO, THEY DO A LOT OF FREE DRAWING TO EXPLORE THE POSSIBILITIES. I DEFINITELY BELIEVE THIS HAS A PLACE WITH EXCEPTIONAL YOUNGSTERS TOO. WHEN THEY CREATE SOMETHING, THEY ARE SO VERY PROUD. THEY ARE WITH LOGO ALMOST LIKE LITTLE KIDS WITH A CHRISTMAS TREE!!

I ALSO BELIEVE IN THE IMPORTANCE OF PHYSICAL MOVEMENT AND CONCRETE EXPERIENCES PRIOR TO ABSTRACT EXPERIENCES...AND THAT IS HOW OT AT MARK TWAIN GOT INVOLVED WHEN THE ORIGINAL PROGRAM

INVOLVEMENT ENDED. THE OT'S AT MARK TWAIN FEEL THEY ARE IN THE SCHOOLS TO ENHANCE A CHILD'S PERFORMANCE IN THE EDUCATIONAL SETTING IN THE AREA OF MOTOR DEVELOPMENT, BODY AWARENESS, AND FUNCTIONAL INDEPENDENCE. THERAPY IS ACTIVITY BASED. THE TEAM APPROACH IS SUPPORTED AS OT'S, SLP'S AND TEACHERS TEAM ON SETTING LEARNING OBJECTIVES FOR THE CHILD'S IEP (INDIVIDUALIZED EDUCATIONAL PROGRAM). THE COMPUTER PROGRAM OFFERED ANOTHER WAY TO INCORPORATE OT INTO THE CLASSROOM USING AN INTEGRATED CURRICULUM APPROACH.

III. THE LOGO ENVIRONMENT USED IS ONE IN WHICH STUDENTS MAY EXPLORE RELATIVE DISTANCE, DIRECTIONALITY, SPATIAL RELATIONS, LANGUAGE DEVELOPMENT, PLANNING SKILLS, DECISION-MAKING AND PROBLEM-SOLVING. THERE ARE REALLY TWO PROGRAM, EACH DEPENDENT UPON IBM LOGO. ONE CONSISTS OF SIXTY-EIGHT SEQUENCED TASKS AND SEVERAL OTHER PROCEDURES WHICH ALLOW A STUDENT TO MOVE A DESIGNATED SCREEN OBJECT (THE LOGO TURTLE, A SMALL TRIANGULAR SHAPE) AND DRAW A LINE SO IT IS TOUCHING ANOTHER SHAPE (SQUARE, CIRCLE OR TRIANGLE). THAT SHAPE IS PLACED IN ONE OF NINE DESIGNATED SCREEN LOCATIONS. BOTH THE DIRECTION OF MOVEMENT ALLOWED AND THE SIZE OF THE ANGLE OF THE TURTLE'S MOVEMENT ARE CONTROLLED AND SEQUENCED BY THE ORDER OF PRESENTATION OF STIMULI. THE SECOND PROGRAM CONSISTS OF MAZES SEQUENCED FROM SIMPLE TO COMPLEX. A MAZE APPEARS ONSCREEN. THE STUDENT SOLVES IT BY MOVING THE TURTLE, SHOWING THE RESULTS TO THE TEACHER. AT FIRST, CONSISTENCY OF THE TURTLE'S HEADING IS MAINTAINED TO HELP THE STUDENT DEVELOP RELIABLE POSITION IN SPACE RELATIONSHIPS. THIS GIVES HIM SECURITY AND HELPS ENSURE SUCCESS. LATER THE HEADING CAN BE CHANGED FOR VARIETY AND TO EXTEND THE PROBLEM TO BE SOLVED. REAL-BODY ON-FLOOR CONCRETE PHYSICAL ACT'IVITIES PRECEDE ABSTRACT ONSCREEN PROBLEM-SOLVING AS THE STUDENT SHOWS HE OR SHE UNDERSTANDS RIGHT AND LEFT TURNS, FORWARD AND BACKWARD MOVEMENTS, AND RELATIVE DISTANCES. BOTH TEACHER AND OT SHARE IN PHYSICAL AND COMPUTER ACTIVITIES.

THE GOAL WAS TO USE LOGO AS A PROBLEM-SOLVING TOOL IN SPECIFIC SPATIAL RELATION TASKS WITH CHILDREN WHO MET FOUR CRITERIA:

A. THEY WERE NOT FAMILIAR WITH LOGO.

B. THEY HAD NOT EXPERIENCED NORMAL MOTOR DEVELOPMENT.

BEST COPY AVAILABLE

BEST COPY AVAILABLE

C. THEY ARE ENROLLED IN SPECIAL EDUCATION CLASSES AND RECEIVE OT SERVICES.

D. THEY MAY NEED INPUT DEVICES OTHER THAN OR IN ADDITION TO THE KEYBOARD.

IV DEMOGRAPHIC INFORMATION ABOUT THE TEN CHILDREN WITH WHOM THIS PROGRAM WAS EXPLORED FOLLOWS. LET ME INTERJECT THAT ABOUT THE TIME THE CHILDREN WERE BEING SELECTED, I MOVED TO A CLASSROOM POSITION ABOUT 15 MILES FROM MARK TWAIN. THEREFORE, AS I ALSO ASSUMED THE ROLE OF THE CLASSROOM TEACHER FOR THIS PROJECT, ACTUALLY IT WAS IN THE CAPACITY OF AN OUTSIDE RESOURCE PERSON COMING INTO THE CLASSROOM FIFTEEN TO THIRTY MINUTES PER WEEK FOR EIGHT WEEKS THAT I FUNCTIONED. SOME OF THE STUDENTS HAD NO COMPUTER TIME OTHER THAN THIS PROGRAM. OTHERS HAD CAI (COMPUTER ASSISTED INSTRUCTION).

THREE CHILDREN WERE SELECTED TO BE WORKED WITH INDIVIDUALLY ON THE COMPUTER. THEY WERE ALREADY BEING SEEN INDIVIDUALLY FOR OT. THEY WERE CHRONOLOGICALLY 10 AND 11 YEARS OLD WITH MENTAL ABILITY RANGING FROM BEING ON GRADE LEVEL TO BEING THREE YEARS BEHIND. THEIR DIAGNOSES WERE CEREBRAL PALSY WITH VARYING DEGREES OF CONTROL OVER BODY MOVEMENTS. TWO WERE IN WHEELCHAIRS, ONE OF WHOM HAD FLUCTUATING MUSCLE TONE AND MUCH UNCONTROLLED BODY MOVEMENT.

SEVEN STUDENTS WERE SELECTED FOR GROUP INSTRUCTION IN BOTH OT AND COMPUTER. THEIR AGES RANGED FROM 6 TO 9. MENTAL AGES RANGED FROM 3 TO 6. THEY WERE DIAGNOSED AS PHYSICALLY IMPAIRED WITH COMMUNICATION PROBLEMS. CP, APERT'S SYNDROME, KIDNEY DISEASE, SEIZURE DISORDERS, AND HEARING IMPAIRMENTS WERE SPECIFIC DIAGNOSES.

THE PROCESS USED TO SET UP THE LOGO EXPLORATION INCLUDED THESE STEPS:

A. DETERMINED NEED FOR PREREQUISITE SKILLS THROUGH AN ASSESSMENT (SEE EXHIBIT 1).

B. DETERMINED INPUT METHODS -- THE CLASSROOM GROUP GAVE VERBAL INPUT TO THE TEACHER WHO KEYED FOR THEM. TWO OF THE INDIVIDUAL STUDENTS TYPED. ONE STUDENT NEEDED AN ALTERNATIVE INPUT

DEVICE. SHE ALSO NEEDED STRAPS AND LATERAL SUPPORTS FOR GOOD POSITIONING. DEVICES TRIED INCLUDED AN OCULAR SCANNER, A HEAD POINTER, A JOYSTICK, AN ARM SLOT, A TOGGLE SWITCH, A WOBBLE SWITCH, AND A LEAF SWITCH. THE WOBBLE SWITCH AND SCANNER WERE SELECTED.

C. PLANNED FOR INCORPORATION OF OT -- DELIVERY MODELS INCLUDED DIRECT SERVICE THROUGH INDIVIDUAL OR GROUP THERAPY AND INDIRECT SERVICE THROUGH CONSULTATION TO THE TEACHER.

D. INVOLVEMENT OF THE TEACHER.

E. STATEMENT TO THE PARENTS SO THEY UNDERSTOOD WHAT WE WERE DOING AND BECAUSE THEY ARE PART OF THE EDUCATIONAL TEAM.

V. <u>COMPONENTS OF THIS PROJECT</u> -- PROCEDURE FOR IMPLEMENTATION

THE STUDENTS ENJOYED INVENTIVE STORIES. THE COMPUTER PROGRAM I CALL "TASKS" CAN CHALLENGE A CHILD TO GET THE TURTLE TO THE LITTLE BOX OF FOOD AS QUICKLY AS POSSIBLE. THE GOAL IS TO IMPROVE ESTIMATION SKILLS SO THAT THE STUDENT IS ABLE TO MOVE THE TURTLE IN THE MOST EFFICIENT MANNER WITHIN THE SPECIFIC PROBLEM-SOLVING SITUATION. THE FIRST 36 TASKS ACTUALLY PROVIDE 3 OPPORTUNITIES TO SOLVE TWELVE PROBLEMS. THE PROBLEMS APPEAR AT THE LEFT, IN THE MIDDLE AND AT THE RIGHT OF THE SCREEN. THERE ARE 32 MORE PROBLEMS WITH LESS REPETITION. (SEE EXHIBITS 2 AND 3.)

PROGRAM COMMANDS ARE SIMPLE AND CAN BE LEARNED BY ROTE OR TYPED FROM A CUE CARD. THERE ARE ONLY THREE RULES.

RULE 1. THE TURTLE MAY MOVE FD AND BK ONLY.

RULE 2. THE TURTLE MAY MOVE FD AND BK. IT MAY TURN RT 90 OR LT 90. BUT MAY MAKE ONLY ONE LINE. THE LINE MAY NOT HAVE A CORNER.

RULE 3. THE TURTLE MAY MOVE FD AND BK. IT MAY TURN RT 90 OR LT 90. THE LINE MAY ALSO HAVE A CORNER.

ONLY RULE 1 NEEDS BE LEARNED TO SUCCEED AT THE FIRST SEVENTEEN TASKS AND FIRST FOUR MAZES. RULES 2 AND 3 BUILD ON THE PREVIOUS RULE. WHEN RULE 1 IS IN EFFECT, THE SHAPE IS A SQUARE. RULE 2 HAS A CIRCLE, AND A TRIANGLE INDICATES RULE 3.

BEST COPY AVAILABLE

THE SPECIFIC OBJECTIVES OF "TASKS" ARE:

A. TO MOVE TURTLE SO THE LINE IS TOUCHING A SHAPE PLACED IN A DESIGNATED POSITION.

B. TO MOVE TURTLE RELATIVE DISTANCES AND DIRECTIONS WITHIN A SCREEN ENVIRONMENT IN THE MOST EFFICIENT PATTERN POSSIBLE.

C. TO USE THE TERMS FORWARD, BACK, RIGHT 90 AND LEFT 90 WITH ACCURACY.

THE PART I CALL "MAZES" IS WHAT THE CHILDREN WILL SELECT IF THEY HAVE A CHOICE. THEY LIKE THE IDEA THAT TURTLE IS TRAPPED IN A BOX AND THEY ARE TO GET HIM OUT AS QUICKLY AS POSSIBLE.

SPECIFIC OBJECTIVES OF "MAZES" ARE:

A. TO MOVE TURTLE THROUGH AND OUT OF A MAZE.

B. TO USE COMMANDS FD, BK, RT 90 AND LT 90 ACCURATELY.

C. TO MOVE TURTLE RELATIVE DISTANCES AND DIRECTIONS WITHIN A SCREEN ENVIRONMENT WITH RESTRICTIONS.

TASKS AND MAZES MAY BE INTEGRATED OR TAUGHT SEPARATELY AS STUDENTS SUCCESSFULLY MASTER RULES AND SOLVE PROBLEMS PRESENTED. THERE ARE SOME PROBLEMS WITH ONE SOLUTION AND OTHERS WITH MULTIPLE SOLUTIONS. WHITE ON A BLACK SCREEN WAS SELECTED TO REDUCE VISUAL STIMULI. COLOR COULD BE ADDED ON SUCCESSIVE TRIES IF VARIETY WERE DESIRED. RULES MIGHT BE CHANGED BY THE TEACHER TO MODIFY THE TASKS AND EXTEND LEARNING BY ALLOWING ANGLES OTHER THAN 90 DEGREES. THE TURTLE COULD BE PLACED WITH A DIFFERENT HEADING OR IN ANOTHER POSITION. SCREENS COULD BE PRINTED OUT TO CREATE WORKSHEETS IF DESIRED. A RECORD SHEET WAS DEVELOPED FOR RECORDING PROGRESS ALONG THE SEQUENCE OF AN INTEGRATED PRESENTATION. OTHER MAZES MIGHT BE RUN ON TRANSPARENCIES AND STUCK TO THE MONITOR WITH STATIC ELECTRICITY. OCCASIONALLY AN EDUCATIONAL MAGAZINE WILL PRINT THE COMMANDS TO A SUITABLE MAZE FREE FOR THE TYPING!

CHILDREN VIEWED THE MAZES AS EASIER, MORE FUN AND A REWARD. THEY ESPECIALLY LIKED THE MODIFICATION WHEN COLOR WAS ADDED. NEXT CAME A REINFORCEMENT CONSISTING OF SOUND, COLOR CHANGE AND A MESSAGE OF PRAISE. THE COLOR VERSION IS PLANNED SO THAT IF A STUDENT

BEST COPY AVAILABLE

TAKES TURTLE THROUGH A MAZE LINE, THE MAZE AUTOMATICALLY BEGINS AGAIN. KEYING WAS MADE EASIER BY INPUTTING 1 FOR LT 90, 2 FOR FD 10, AND 3 FOR RT 90. THESE ASPECTS ARE STILL BEING PERFECTED AND WILL INCORPORATE STUDENT FEEDBACK. A MANUAL EXISTS FOR BOTH TASKS AND MAZES. IT INCLUDES PROCEDURES, TARGET AUDIENCE, OBJECTIVES, HARDWARE/SOFTWARE REQUIREMENTS, INSTRUCTIONS, PREREQUISITE SKILLS OTHER THAN COMPUTER AND NON-COMPUTER SKILLS, LOADING INSTRUCTIONS, RULES, TROUBLESHOOTING, AND SUGGESTIONS FOR RECORDKEEPING AND EXTENSION ACTIVITIES.

WITH THE COMMITMENT TO A PHILOSOPHY THAT CONCRETE EXPERIENCES SHOULD PRECEDE ABSTRACT ONES AND PHYSICAL ACTIVITY IS A NATURAL AND NECESSARY FOUNDATION FOR LEARNING ACADEMICS, THERE WAS A CONSCIOUS EFFORT TO PLAN ACTIVITIES WITH MUTUAL GOALS IN MIND.

OT ACTIVITIES INCLUDED WORK TO HELP STUDENTS USE DIRECTIONALITY CONCEPTS AND TO IMPROVE BODY AWARENESS AND MOTOR PLANNING. LOTION OR A WEIGHT OR STICKER ON THE LEFT ARM BEGAN THERAPY. ALL OF THE ACTIVITIES USED LOGO COMMANDS SUCH AS "FORWARD 3." THE KIDS CALL THIS "TURTLE TALK." ACTIVITIES INCLUDED SIMON SAYS, OBSTACLE COURSES OF MANY TYPES, SHUFFLE-TOWN BY FISHER-PRICE, BASKETBALL WITH A WRITTEN "GAME PLAN" TO FOLLOW, AND MANEUVERING THROUGH A PRETEND TOWN. OBSTACLE COURSES WERE SET UP ON THE FLOOR OR ON PAPER, SOME REQUIRING A SCOOTERBOARD. CHILD AND THERAPIST TOOK TURNS BEING "TEACHER" AND GAVE DIRECTIONS TO EACH OTHER TO GET TO A SPECIFIC DESTINATION. THIS GAVE THE CHILD THE SENSE OF CONTROL OVER HIS ENVIRONMENT, MUCH AS LOGO DOES WHEN CHILD TAKES CONTROL OF TURTLE!

VI <u>A PICTURE OF TEAMING</u> EMERGED AS OT SOUGHT TO IMPROVE LATERALITY, BODY AWARENESS, DIRECTIONALITY CONCEPTS, MOTOR PLANNING AND VISUAL PERCEPTION. THE TEACHER SOUGHT TO IMPROVE LOGICAL THINKING, COMPUTER SKILLS, PROBLEM SOLVING AND RISK TAKING, MATH AND LANGUAGE.

THE CLASSROOM PROGRESSION SHEET OF COMPUTER ACTIVITIES FOR THIS EIGHT-WEEK PERIOD OF INSTRUCTION (15 TO 30 MINUTES A WEEK) SHOWS THE PROCEDURE FROM CONCRETE ACTIVITIES WITH THE STUDENTS' BODIES, TO USING A PROP IN A HORIZONTAL PLANE, TO MOVING WITH THE PROP TO A VERTICAL PLANE (SEE EXHIBIT 4). OFFLINE REFERS TO THOSE ACTIVITIES NOT USING A COMPUTER; ONLINE INCLUDES THE COMPUTER. THERE WERE INVENTIVE STORIES TO ENCOURAGE IDENTIFICATION WITH TURTLE AND HIS PLIGHT. MANY CONCRETE EXPERIENCES WERE NEEDED TO

BEST COPY AVAILABLE

HELP CHILDREN UNDERSTAND FD/BK RELATIVE TO MOVING FROM DIFFERENT PERSPECTIVES. REPETITION OF THE LANGUAGE WAS FREQUENT TO DEVELOP COMMAND SYNTAX. FREE DRAWING WAS APPROACHED QUITE DIFFERENTLY FOR THE GROUP THAN FOR THE INDIVIDUALS BECAUSE OF THE DIFFERENCES IN THEIR DEVELOPMENTAL LEVELS. LASTLY, ATTENTION TO KEYBOARDING DIFFERENCES CAN BE NOTED.

YOU RECALL THIS PROGRAM WAS ALSO FURNISHED TO ANOTHER SCHOOL SITE FOR USE BY A CHILD WHO ATTENDED THE ORIGINAL DISTRICT OT PROGRAM. THAT CHILD RECEIVED THIS PROGRAM IN THE HOME SCHOOL SETTING DURING 1985-86 BUT THERE WAS NO TEAMING WITH OT. SHE IS A COMMUNICATION DISORDERED STUDENT WHOSE FIRST LANGUAGE IS NOT ENGLISH. SHE ALSO HAS MOTOR DEVELOPMENT PROBLEMS AND QUALIFIES FOR OCCUPATIONAL THERAPY. SHE IS IN A FULL-TIME SPECIAL EDUCATION PROGRAM AS ARE ALL THE OTHERS IN OUR EXPLORATION. THE TEACHER IMPLEMENTED TASKS AND MAZES WITHOUT ASSISTANCE FROM US. SHE REPORTS THAT SHE USED THE PROGRAM TO HELP DEVELOP PREDICTION AND CRITICAL THINKING SKILLS. EIGHT STUDENTS USED THE PROGRAM EVERY OTHER DAY FOR TWO MONTHS AND PREFERRED THE MAZES. SHE RELIED ON STUDENT AIDES (THAT MEANS ELEMENTARY STUDENTS) TO MONITER THE STUDENTS' USE OF THE PROGRAM. SHE HAD ONLY THE BLACK AND WHITE VERSION AND RECOMMENDED COLOR AND INSTANT FEEDBACK BE ADDED. SHE NOTED IMPROVEMENT IN STUDENTS.

VII <u>ANALYSIS OF PROJECT AND CONCLUSION</u> -- ANALYSIS CONSISTED OF TWO PARTS: EVALUATIONS BY USERS AND OBSERVATIONS OF STUDENT BEHAVIOR.

A. THERE WERE <u>EVALUATIONS</u> BY TEACHERS, OT'S, STUDENTS AND THE ADMINISTRATOR INVOLVED. COMMENTS INCLUDE: THE PROGRAM NEEDS TO BE EXPANDED, BOTH IN THE NUMBERS OF CHILDREN INVOLVED AND IN THE FREQUENCY OF USE. STUDENTS BECAME MOTIVATED TO USE THE COMPUTER AND DEMONSTRATED AN AMAZING ATTENTION SPAN. FAILURE WAS PREDICTED BY STAFF BUT THERE WAS AN ELEMENT OF NON-FAILURE: SUCCESS FOR EACH AND EVERY ONE! OT'S MIGHT WANT TO EXAMINE THE USEFULNESS OF INCORPORATING MORE COMPUTER TIME INTO OT. A LARGER BUDGET IS NEEDED FOR COMPUTER PEOPLE WHO COME INTO CLASSROOMS AND GIVE DIRECT SERVICE TO STUDENTS AND TEACHERS. LANGUAGE DEVELOPMENT AND DIRECTIONALITY WERE REINFORCED. TEAMING BETWEEN TEACHER AND OT IS SUCCESSFUL. ADAPTIVE EQUIPMENT MUST BE MADE AVAILABLE FOR STUDENTS WHO NEED IT. THE LOGO PROGRAM SHOULD BE USED

BEST COPY AVAILABLE

IMMEDIATELY AFTER OT FOR BEST REINFORCEMENT OF DIRECTIONALITY AND MOTOR PLANNING. THE ADMINISTRATOR EXPECTED NO OBSERVABLE RESULTS BUT WAS AMAZED BECAUSE STUDENTS WERE ASSIMILATING INFORMATION AND CARRYING THEIR LEARNING OVER FROM THE COMPUTER INTO OTHER ACTIVITIES. THEY WERE ABLE TO ATTEND AND BECAME ACTIVELY INVOLVED AS THEY BOTH ENJOYED IT AND LEARNED FROM IT. SHE SAID STUDENTS FELT THEY HAD MORE CONTROL OVER THE COMPUTER; IT WAS NOT JUST A TOY THEY PLAYED GAMES ON. THEY COULD CONTROL AND PERFORM AN ACTIVITY WITH IT, AS OPPOSED TO YES, NO, SELECTING AN ANSWER WITH ONE KEY. SHE SAID IT WAS ALSO IMPORTANT FOR THE TEACHERS WHO WERE NOT COMFORTABLE WITH THE COMPUTER TO SEE HOW THEY COULD EXTEND IT INTO THEIR TOTAL CURRICULUM. SHE STRONGLY FELT THE FREQUENCY SHOULD BE EXPANDED, MORE STUDENTS SHOULD BE INCLUDED, AND A RESOURCE PERSON SHOULD WORK DIRECTLY WITH THE CHILDREN.

B. <u>STUDENT BEHAVIOR</u> WHICH WAS OBSERVED INCLUDED:

PROBLEM-SOLVING STRATEGIES
UNPROMPTED COMMUNICATION
MOTIVATION TO LEARN MORE ABOUT LOGO

SUSAN USED THE WORDS LIKE "DIAGONAL" WHEN DESCRIBING HOW SHE WANTED TO DRAW A TRIANGLE. IT TOOK HER 30 MINUTES TO DRAW THE TRIANGLE THROUGH DICTATION. THEN SHE WANTED TO PRINT IT BUT WE HAD TROUBLE WITH THE PRINTER. THINKING I DID NOT KNOW WHAT TO DO, SHE SUGGESTED I LOOK FOR A BOOK WHICH TOLD HOW TO USE THE PRINTER!

JULIE MOVED TURTLE SO MANY TIMES USING THE 1, 2 , 3 COMMANDS THAT SHE RECEIVED AN OUT OF SPACE ERROR. I TOLD HER IT MEANT TURTLE SAID NO, HE WOULDN'T GO. SHE WAS DELIGHTED.

THERE WAS MUCH CONFUSION ABOUT FORWARD-BACK VERSUS UP-DOWN AMONG THE GROUP OF SEVEN, EVEN AFTER MANY ACTIVITIES. STRATEGIES USED BY ALL INCLUDED THE PLASTIC TURTLE (SEE CLASSROOM PROGRESSION SHEET). SUSAN AND ROBERT NEEDED THE TEACHER TO HOLD THE TURTLE BUT COULD DIRECT IT. ROBERT WOULD SOLVE A PROBLEM BY MOVING TO THE MIDDLE IN ONE COMMAND THEN TAKING TINY, TINY STEPS SO THAT HE COULD BE EXACT IN HIS SOLUTION. IF HE SHOULD OVERSHOOT THE TARGET, HE WOULD BACK THE EXACT AMOUNT OF THE PREVIOUS COMMAND TO GET TO THE PREVIOUS POSITION THEN TAKE TINY STEPS TO ADJUST FOR THE OVERSHOOT. SUSAN COULD ADD TWO FD COMMANDS TO PROJECT THE SOLUTION WHICH COULD HAVE BEEN MADE IN ONE COMMAND. ROBERT HAD REVERSED EVERY RIGHT/LEFT ITEM ON THE ORIGINAL ASSESSMENT BUT WAS 100% ACCURATE IN THE POST-TEST.

BEST COPY AVAILABLE

MOTIVATION WAS HIGH TO LEARN MORE. SUSAN TOLD ME I DID NOT NEED TO INSTRUCT HER CLASSMATES BECAUSE SHE ALREADY HAD. ROBERT'S TEACHER SAID HE HAD NOT BEEN TURNED ON TO THE COMPUTER BEFORE THE PROJECT BUT HAD 3 STUDENTS OF HIS OWN BY ITS CULMINATION. THERE WAS BENEFIT EVEN WITH MINIMAL EXPOSURE!

VIII <u>GUIDELINES TO STAFF WHO WANT TO REPLICATE THIS KIND OF PROJECT</u> -- THESE GUIDELINES ADDRESS THE MAJOR ELEMENTS TO CONSIDER INCLUDING PHILOSOPHY, PERSONNEL, SELECTION OF STUDENTS, HOW MATERIALS ARE TO BE USED, INITIAL IMPLEMENTATION, SELECTION OF RESOURCES, ROLE OF PHYSICAL ACTIVITIES, AND THE POWER OF CONTROL OVER THE ENVIRONMENT, WHICH IS INHERENT IN LOGO (EXHIBIT 5).

THANKS ARE EXTENDED TO PAM BAKKE AND MARY SUE WILLIAMS AND OTHERS AT MARK TWAIN SCHOOL, TO BRYAN LANGDON, TRANCI ROMERO AND TOM BRILL!

BEST COPY AVAILABLE

LOGO OT, MARK TWAIN SATELLITE PROJECT FALL 1985

STUDENT'S NAME DATE

INTERVIEW QUESTIONS

1. PREREQUISITE SKILLS C=correct H=hesitant I=incorrect

Point to:

___Left eye	___Right eye
___Right ear	___Left leg
___Left foot	___Right foot
___Left hand (hold block in)	___Left ear

Match these letters: (Use matching cards or blocks; record errors.)

___F ___D ___R ___L ___T ___B ___K

SHOW ME HOW YOU CAN MOVE: (C, H, I)

___forward	___move your body to the left
___move your body to the right	___backward

___turn your body left and go forward
___turn your body right and go backward

READ: (Put a slash through any not read correctly on first attempt.)
(Numbers are to be put on cards or presented on a separate sheet of paper.)

9 2 5 7 3 1 4 6 8 30 40 20 10 50 100 60 90
80 70

LOGO FAMILIAR: (With LOGO turtle on screen, ask the following and record answers.)

a. What could we call this? (turtle, cursor)

b. How can we use this? (draw things, write procedures)

c. Have you ever worked with LOGO? (yes, no)

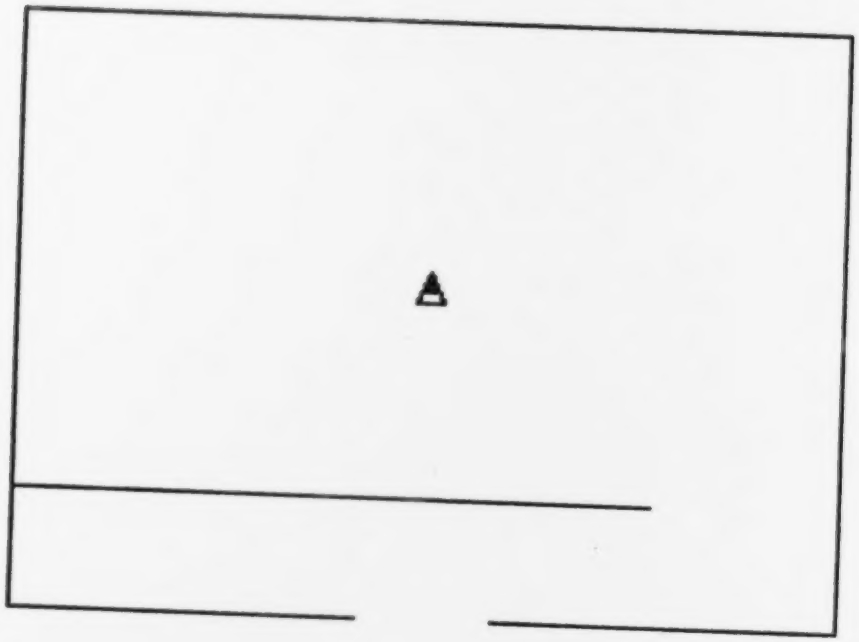
d. What does LOGO mean? (a game, something for the computer, a language, a name for computer stuff, it lets the turtle do stuff)

?T4

?T5

?T6

EXHIBIT 2. SCREEN SAMPLE: TASKS



M2
M9
?

```
TO M9
M2
PU SETPOS [-120 -65]
PD RT 90 FD 185
PU HOME PD [M9]
ST
END
```

EXHIBIT 3. SCREEN SAMPLE: MAZES

BEST COPY AVAILABLE

CLASSROOM PROGRESSION SHEET

1. FD WITH BODY (MOTHER, MAY I?)

2. FD/BK WITH BODY (SAME)

3. FD WITH PROP (GAMEBOARD, TURTLE TOKEN; LEADER, MAY I?

4. FD/BK WITH OFFLINE PROP IN HORIZONTAL PLANE, VERTICAL PLANE

5. RT/LT ON BODY (IDENTIFY)

6. FD/BK ONSCREEN WITH PROP USING PLASTIC TURTLE OVERLAY (SOURCE: THE ARITHMETIC TEACHER)

7. SIZE OF TURTLE STEPS: BABY TURTLE STEPS FOR NUMBERS 10 AND LESS. GREAT BIG STEPS WHEN TEACHER ADDS A ZERO. THIS IS USED WITH STUDENTS WHO DO NOT COUNT OVER 10.

8. RT/LT SIDE OF MONITOR; COLORED STICKER ON LEFT SIDE OF MONITOR AND ON LEFT HAND.

9. RT/LT ONSCREEN WITH PROP (TURTLE OVERLAY) (SHARP 90 DEGREE TURNS)

9A. PROBLEM-SOLVING OF SPECIFIC TASKS
T1- 68, M1-M14

9B. FREE DRAWING, SELF-SELECTION; BOX, TRIANGLE, FREE FORM; CLOSED FIGURE

9C. RT/LT ONSCREEN › ‹ 90 DEGREES

10. HT/ST

11. PROBLEM-SOLVING OF SPECIFIC TASKS

11A ONLINE FD (VERTICAL) TURTLE WALKING ALONG AND DID NOT NOTICE BOX, FELL IN AND GOT TRAPPED. CAN YOU HELP GET HIM OUT? M1

11B ONLINE FD (HORIZONTAL) TURTLE HAD A BROTHER WHO FELL IN ANOTHER BOX. CAN YOU GET HIM OUT? M3 (SEEING THAT FD IS NOT EQUIVALENT TO UP.)

EXHIBIT 4

BEST COPY AVAILABLE

BEST COPY AVAILABLE

11C ESTIMATION, REACHING TARGET: TURTLE IS HUNGRY. THERE IS FOOD IN THAT BOX. CAN YOU HELP TURTLE GET TO THE FOOD? HT TO BE SURE HE IS THERE. TASKS.

12 "FREE DRAWING" -- TEACHER DIRECTED; CAN YOU GET TURTLE OVER TO THIS NICE QUIET SPOT WHERE HE CAN REST?

13 OFFLINE FD/BK FROM DIFFERENT PERSPECTIVES
STERN TRAIN -- 1 BLOCK WITH EYES TO SHOW HEADING
LEADER, MAY I? WITH TRAINS PLACED IN DIFFERENT DIRECTIONS TO FACILITATE UNDERSTANDING OF FD/BK RELATIVE TO MOVING OBJECT AND FROM DIFFERENT LOCATIONS

14 TRANSITION TO ONLINE SCREEN ENVIRONMENT -- FREE DRAWING AND M2, M4, M5; FD = L; FD = DOWN; FD = DIAGONALLY UP.

15. COMMAND SYNTAX: OFFLINE USING LETTER CARDS WITH COMMANDS WRITTEN ON THEM SUCH AS, FD ___, RT 90, LT ___, BK ___

16. LASSESS RIGHT AND LFT ON BODY AND FD/BK WITH BODY

17. OFFLINE AND ONLINE -- INTRODUCE KEYBOARD TO INDIVIDUAL STUDENTS FOR INPUTING OF DATA INDIVIDUALLY. THIS IS FOR THOSE STUDENTS WHO HAVE BEEN WORKING IN GROUP AND WHO HAVE NOT USED ANY INPUT DEVICE OTHER THAN DICTATION.

18. FREE DRAWING EXPANDED: PU, PD, CS, CT

19. COLOR: SETBG, SETPC, SETPAL, WAIT

20. REASSESSMENT OF SKILLS WHICH WERE DEFICIENT ON ORIGINAL ASSESSMENT

NOTE: LOGO commands included in above listing are FD, BK, RT, LT, PU, PD, CS, CT, HT, ST, SETBG, SETPC, SETPAL, WAIT.

BEST COPY AVAILABLE

GUIDELINES TO STAFF WHO WANT TO DO THIS KIND OF PROJECT ***

1 ROLE OF THE REAL LIVE PERSON: In this exploration, Elaine assumed the role of the classroom teacher. If you did indeed have another person coming into the classroom, it would behoove the teacher to develop rudimentary skills in LOGO so students could participate in free drawing and problem-solving during the week and after use of the program is concluded. Whoever works with students should keep a log and note any changes in learning, communication, response rate, and problem solving strategies. An aide, a parent, a student teacher could be trained to do this in place of the classroom teacher or OT. Consultation time is essential to monitor progress with accuracy and have the child receive the greatest benefits. Because LOGO is an interactive environment and requires some instruction, and because the goal of TASKS and MAZES is improved successive approximation of estimation skills and efficiency of problem-solving strategies, success is directly related to a communication model with feedback provided both onscreen and by a human. Once the child has skills to engage in free drawing, except for expanding his skills base through instruction, that person is not required for free drawing. In fact, during free drawing, it is essential to remember the instructor is a FACILITATOR and children must be allowed to explore and learn from their miscalculations as well as their successes.

2 USE OF MATERIALS: It is essential the teacher and occupational therapist understand the intent of this type of teaming and be agreed upon their purpose. A clear understanding of the basics of LOGO and the philosophy of including it in a school's instructional program are required. A clear understanding of the turtle environment (turtle's visible shape, position and heading) is essential.

3 SELECTION OF STUDENTS: We recommend this program for students with little experience with LOGO. We found it was helpful to children who were working on the directionality skills of left and right.

4 USING LOGO RATHER THAN BASIC TO SET UP TASKS AND MAZES: This program of TASKS and MAZES is dependent upon IBM LOGO. It will not run without it. While it might have been just as effective to program TASKS and MAZES using BASIC, and while it would have allowed us to be independent of a commercial program, it was felt that writing LOGO procedures is more easily within the grasp of most classroom teachers than is programming in BASIC. Part of what Elaine wanted to demonstrate is that here is a language which will allow a teacher to program environments for students in the classroom. The language is powerful and the environments are vast. Nevertheless, a classroom teacher with only the basics and the manual can produce useful results which excite and benefit children AND meet specific needs in their instructional program. Students can then move from TASKS and MAZES into writing their own LOGO procedures. Any LOGO language for any brand of computer can be used. We chose IBM LOGO because we had selected IBM as the computer for instruction in Special Education classrooms in Albuquerque.

5 INITIAL IMPLEMENTATION: If teachers are somewhat new to LOGO, it might be useful to have a resource teacher come into the classroom to help in the implementation and in the creation of learning materials which may assist the teacher and OT present an integrated program. It is recommended that each OT session be followed by a computer session. It would be assumed that the classroom teacher would be taking a LOGO class concommitantly for best results. It would also add dimension to the program if a robot were available for programming so students could really see the effects of their commands in the real world before moving to the screen. An inexpensive robot probably will accomplish results as effective as a more costly one.

6 LOOKING AHEAD: New screen environments for problem-solving would be envisioned and designed using LOGO. The resource teacher could help create these environments as the need for them is realized. One caution is this: Do not recreate a situation onscreen just to have it on the computer if it is already successful in another environment. An example is parquetry. If the students can manipulate the materials, then

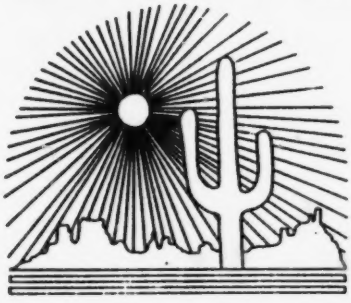
BEST COPY AVAILABLE

why put it onscreen? If, however, the students could benefit from parquetry like activities but cannot benefit from even a modified method of using the concrete materials, then by all means design a similar environment from which they CAN benefit!

7 RESOURCES: A search of LOGO materials will reveal a multitude of suggestions for successfully introducing the programming language into the regular education setting. Many of the guides are machine and software specific, so be aware of this when you are selecting reference books.

8 ROLE OF PHYSICAL ACTIVITIES: REMEMBER that physical activities (both gross and fine) precede more abstract learning on the computer screen and should also be continued along with the use of LOGO. In the project at Mark Twain, the OT's role was to work with the children on motor activities aimed at supporting the computer tasks. The teachers followed through on the activities as time allowed in the classroom. Taking turtle steps on a large circle, playing games where one child is turtle or playing Leader, May I? , practicing right-left discrimination, and walking (or moving one's wheelchair) relative distances in "turtle steps" are examples of gross motor activities that were led by OT's and/or teachers. Drawing on graph paper and pencil and paper mazes are examples of fine motor activities. Relating relative distance in the real world to that in the screen environment is important and may fall somewhat in the realm of gross motor skills. Moving along a number line or on a floor grid will be helpful.

9 POWER OF FREE DRAWING: As the student develops the skill to draw more complex patterns, his understanding of the screen environment will expand. From time to time TASKS could be used as a check to see if estimation skills and response time have improved. The student could create his own mazes!



SOURCES OF INFORMATION

_____. LOGO: PROGRAMMING WITH TURTLE GRAPHICS. IBM. 1983.

BEHRMANN, MICHAEL. HANDBOOK OF MICROCOMPUTERS IN SPECIAL EDUCATION. COLLEGE-HILL PRESS. 1984. AVAILABLE FROM COUNCIL FOR EXCEPTIONAL CHILDREN.

GREEN, CAROLYN AND CHRISTI JAEGER. THE TEACHER, KIDS AND LOGO. EDUCOMP PUBLICATIONS. 1984.

HAGEN, DOLORES. MICROCOMPUTER RESOURCE BOOK FOR SPECIAL EDUCATION. RESTON PUBLISHING COMPANY, INC. 1984. AVAILABLE FROM COUNCIL FOR EXCEPTIONAL CHILDREN.

SCHOOL MICROCOMPUTING BULLETIN. LEARNING PUBLICATIONS, INC.

LOGO. IBM. LOGO COMPUTER SYSTEMS, INC. 1983.

TIPPS, STEVE, ET AL. NUDGES. IBM LOGO PROJECTS. HOLT, RINEHART AND WINSTON. 1984.

Paper presented at the Annual Convention

of the

Council for Exceptional Children

(64th, New Orleans, LA, March 31-April 4, 1986)

BEST COPY AVAILABLE

TITLE: THE MOTOR SPECIALIST AND CLASSROOM TEACHER TEAM WITH LOGO

AUTHOR: ELAINE C. MONTAGUE
6009 ASPEN AV NE
ALBUQUERQUE, NEW MEXICO 87110

CONTENTS: ERIC Form EFF 53
ABSTRACT -- 2 pages
ARTICLE
APPENDIX
EXHIBIT 1. Student Assessment
EXHIBIT 2. Screen Sample: Tasks
EXHIBIT 3. Screen Sample: Mazes
EXHIBIT 4. Classroom Progression Sheet
EXHIBIT 5. Guidelines for Replication
EXHIBIT 6. Sources of Information

SYNOPSIS:

This is an article describing an original computer program written to improve visual perception and motor skills of special education students who also receive services from an occupational therapist. It describes a method of teaming between OT and classroom teacher to achieve mutually supportive goals for the child, particularly in the areas of directionality and motor planning. The programming language used is IBM LOGO. Any other LOGO could be used in the same manner, allowing use on any brand of computer.